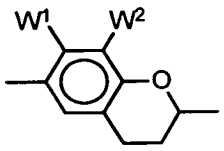
CLAIMS

1. A liquid crystal display element:

having a structure comprising a pair of substrates, and a liquid crystal composition sandwiched between the substrates;

comprising at least an alignment control layer, a transparent electrode, and a polarizing plate; and

characterized in that the liquid crystal composition comprises at least one liquid crystal compound having a partial structure represented by general formula (A):

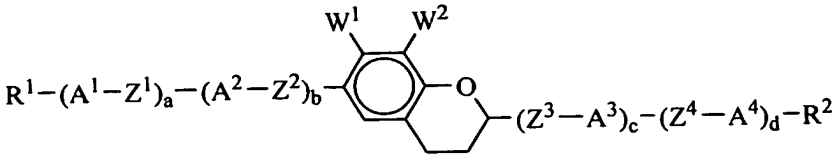



(A)

(wherein $W^1$ and $W^2$ each independently represents fluorine, chlorine, $-CF_3$, $-CF_2H$, $-OCF_3$, or $-OCF_2H$) and has a negative dielectric anistropy.

2. (Amended) A liquid crystal display element according to claim 1, wherein $W^1$ and $W^2$ represent fluorine in the general formula (A).

3. A compound represented by general formula (1):



(1)

(wherein

$R^1$ and $R^2$ each independently represents hydrogen, an alkyl group having 1 to 12 carbon atoms or an alkenyl group having 2 to 12 carbon atoms, in which one $CH_2$ group or at least two $CH_2$ groups that are not adjacent to each other may be substituted by oxygen or sulfur, or in which at least one hydrogen may be substitued by fluorine or chlorine,

$A^1$, $A^2$, $A^3$, and $A^4$ each independently represents a trans-1,4-cyclohexylene group (in which one $CH_2$ group or two $CH_2$ groups that are not adjacent to each other may be substituted by oxygen or sulfur), a 1,4-phenylene group ( in which at least one CH group may be substituted by nitrogen), a 1,4-cyclohexenylene group, a 1,4-bicyclo[2.2.2]octylene group, a piperidine-1,4-diyl group, a naphthalene-2,6-diyl group, a decahydronaphthalene-2,6-diyl group or a 1,2,3,4-tetrahydronaphthalene-2,6-diyl group, in which hydrogen may be substituted by -CN or halogen,

$Z^1$, $Z^2$, $Z^3$, and $Z^4$ each independently represents $-CH_2CH_2-$, -CH=CH-, $-CH(CH_3)CH_2-$, $-CH_2CH(CH_3)-$, $-CH(CH_3)CH(CH_3)-$, $-CF_2CF_2-$, -CF=CF-, $-CH_2O-$,

$-OCH_2-$, $-OCH(CH_3)-$, $-CH(CH_3)O-$, $-(CH_2)_4-$, $-(CH_2)_3O-$, $-O(CH_2)_3$, $-C\equiv C-$, $-CF_2O-$, $-OCF_2-$, -COO-, -OCO, -COS, -SCO-, or a single bond,

when $A^1$, $A^2$, $A^3$, $A^4$, $Z^1$, $Z^2$, $Z^3$, and $Z^4$ respectively exist in plural, they may be identical to each other or different from each other,

a, b, c, and d each independently represents 0 or 1, and

$W^1$ and $W^2$ each independently represents fluorine, chlorine, $-CF_3$, $-CF_2H$, $-OCF_3$, or $-OCF_2H$).

4. (Amended) A compound according to claim 3, wherein $R^1$ and $R^2$ each independently represents an alkyl group having 1 to 7 carbon atoms or an alkenyl group having 2 to 7 carbon atoms (in which one $CH_2$ group may be substituted by oxygen), and $W^1$ and $W^2$ represent fluorine in the general formula (1).

5. (Amended) A compound according to claim 3, wherein $A^1$, $A^2$, $A^3$ and $A^4$ each independently represents a trans1,4-cyclohexylene group, a 1,4-phenylene group which may be substituted by at least one fluorine, or a 1,4-bicyclo[2.2.2]octylene group in the general formula (1).

6. (Amended) A compound according to claim 3, wherein $Z^1$, $Z^2$, $Z^3$, and $Z^4$ each independently represents $-CH_2CH_2-$, $-CH=CH-$, $-CF_2CF_2-$, $-CF=CF-$, $-CH_2O-$, $-OCH_2-$, $-C\equiv C-$, $-CF_2O-$, $-OCF_2-$ or a single bond in the general formula (1).

7. (Amended) A compound according to claim 3, wherein the sum of a, b, c, and d is 1 or 2 in the general formula (1).

8. (Amended) A compound according to claim 3, wherein $R^1$ and $R^2$ each independently represents an alkyl group having 1 to 7 carbon atoms or an alkenyl group having 2 to 7 carbon atoms (in which a $CH_2$ group may be substituted by oxygen), $W^1$ and $W^2$ represent fluorine, $A^1$, $A^2$, $A^3$, and $A^4$ each independently represents a trans-1,4-cyclohexylene group, a 1,4-phenylene group which may be substituted by at least one fluorine, or a 1,4-bicyclo[2.2.2]octylene group, $Z^1$, $Z^2$, $Z^3$ and $Z^4$ each independently represents $-CH_2CH_2-$, $-CH=CH-$, $-CF_2CF_2-$, $-CF=CF-$, $-CH_2O-$, $-OCH_2-$, $-C\equiv C-$, $-CF_2O-$, $-OCF_2-$, or a single bond, and the sum of a, b, c, and d is 1 or 2 in the general formula (1).

9. (Amended) A compound according to claim 3, wherein $R^1$ and $R^2$ each

independently represents an alkyl group having 1 to 7 carbon atoms, an alkenyl group having 2 to 7 carbon atoms, or an alkoxyl group having 1 to 7 carbon atoms, $A^1$, $A^2$, $A^3$, and $A^4$ each independently represents a trans-1,4-cyclohexylene group, a 1,4-phenylene group, a 2-fluoro-1,4-phenylene group, a 3-fluoro-1,4-phenylene group, or a 2,3-difluoro-1,4-phenylene group, $Z^1$, $Z^2$, $Z^3$, and $Z^4$ each independently represents $-CH_2CH_2-$, $-CH_2O-$, $-OCH_2-$, or a single bond, $W^1$ and $W^2$ represent fluorine, and the sum of a, b, c, and d is 1 or 2 in the general formula (1).

10. (Amended) A compound according to claim 9, wherein $A^1$, $A^2$, $A^3$, and $A^4$ each independently represents a trans-1,4-cyclohexylene group or a 1,4-phenylene group in the general formula (1).

11. (Canceled)

12. (Canceled)

13. (Amended) A liquid crystal composition comprising at least one liquid crystal compound according to any one of claims 3 to 10.

14. (Canceled)

15. (Amended) A liquid crystal composition according to claim 13, comprising at least one compound represented by general formula (2):

$$R^3-B^1-Y^1-(B^2-Y^2)_p-R^4 \qquad (2)$$

(wherein,

$R^3$ and $R^4$ each independently represents hydrogen, an alkyl group having 1 to 12 carbon atoms or an alkenyl group having 2 to 12 carbon atoms, in which one $CH_2$ group or at least two $CH_2$ groups that are not adjacent to each other may be substituted by oxygen or sulfur, or in which at least one hydrogen may be substitued by fluorine or chlorine,

$B^1$ and $B^2$ each independently represents a trans-1,4-cyclohexylene group (in which one $CH_2$ group or two $CH_2$ groups that are not adjacent to each other may be substituted by oxygen or sulfur), a 1,4-phenylene group ( in which at least one CH group may be substituted by nitrogen), a 1,4-cyclohexenylene group, a 1,4-bicyclo[2.2.2]octylene group, a piperidine-1,4-diyl group, a naphthalene-2,6-diyl group, a decahydronaphthalene-2,6-diyl group or a

1,2,3,4-tetrahydronaphthalene-2,6-diyl group, in which hydrogen may be substituted by -CN or halogen,

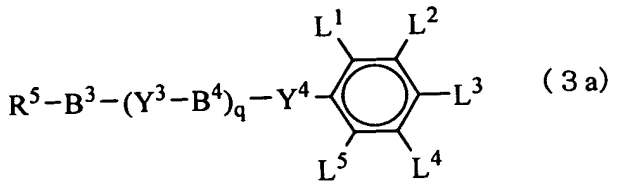
$Y^1$ and $Y^2$ each independently represents $-CH_2CH_2-$, $-CH=CH-$, $-CH(CH_3)CH_2-$, $-CH_2CH(CH_3)-$, $-CH(CH_3)CH(CH_3)-$, $-CF_2CF_2-$, $-CF=CF-$, $-CH_2O-$, $-OCH_2-$, $-OCH(CH_3)-$, $-CH(CH_3)O-$, $-(CH_2)_4-$, $-(CH_2)_3O-$, $-O(CH_2)_3-$, $-C\equiv C-$, $-CF_2O-$, $-OCF_2-$, -COO-, -OCO, -COS, -SCO-, or a single bond,

when $Y^2$ and $B^2$ respectively exist in plural, they may be identical to each other or different from each other, and

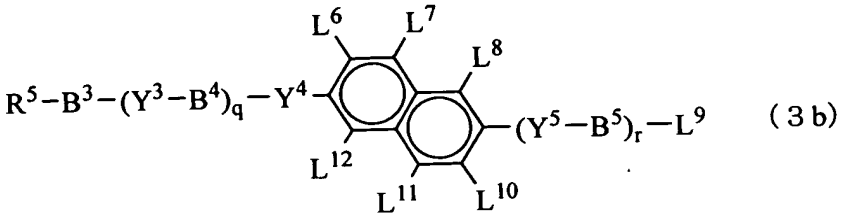
p represents 0, 1 or 2).

16. (Amended) A liquid crystal display element according to claim 1, comprising at least one compound represented by the general formula (2) according to claim 15.

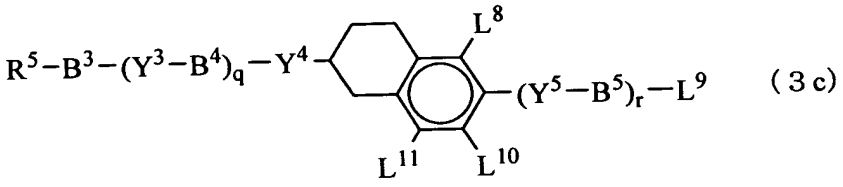
17. (Amended) A liquid crystal composition according to claim 13, comprising at least one compound selected from the group consisting of compounds represented by general formula (3a), general formula (3b), and general formula (3c):



(3a)



(3b)



(3c)

(wherein

$R^5$ represents hydrogen, an alkyl group having 1 to 12 carbon atoms or an alkenyl group having 2 to 12 carbon atoms, in which one $CH_2$ group or at least two $CH_2$ groups that are not adjacent to each other may be substituted by oxygen or sulfur, or in which at least one hydrogen may be substitued by fluorine or chlorine,

$B^3$, $B^4$, and $B^5$ each independently represents a trans-1,4-cyclohexylene group (in which one $CH_2$ group or two $CH_2$ groups that are not adjacent to each other may be substituted by oxygen or sulfur), a 1,4-phenylene group ( in which at least one CH group may be substituted by nitrogen), a 1,4-cyclohexenylene group, a 1,4-bicyclo[2.2.2]octylene group, a piperidine-1,4-diyl group, a naphthalene-2,6-diyl group, a decahydronaphthalene-2,6-diyl group or a

1,2,3,4-tetrahydronaphthalene-2,6-diyl group, in which hydrogen may be substituted by -CN or halogen,

$Y^3$, $Y^4$, and $Y^5$ each independently represents $-CH_2CH_2-$, $-CH=CH-$, $-CH(CH_3)CH_2-$, $-CH_2CH(CH_3)-$, $-CH(CH_3)CH(CH_3)-$, $-CF_2CF_2-$, $-CF=CF-$, $-CH_2O-$, $-OCH_2-$, $-OCH(CH_3)-$, $-CH(CH_3)O-$, $-(CH_2)_4-$, $-(CH_2)_3O-$, $-O(CH_2)_3-$, $-C\equiv C-$, $-CF_2O-$, $-OCF_2-$, -COO-, -OCO, -COS, -SCO-, or a single bond,

$L^1$, $L^2$, $L^4$, $L^5$, $L^6$, $L^7$, $L^8$, $L^{10}$, $L^{11}$, and $L^{12}$ each independently represents hydrogen or fluorine,

q and r each independently represents 0, 1, or 2, provided that the sum of q and r is no more than 2, and

$L^3$ and $L^9$ each independently represents hydrogen, fluorine, chlorine, -CN, $-CF_3$, $-OCH_2F$, $-OCHF_2$, $-OCF_3$, $-CH_2CF_3$, or the same meaning as $R^5$).

18. (Amended) A liquid crystal composition according to claim 13, wherein a content ratio of the liquid crystal compound according to any one of claims 3 to 10 is 2 to 30% by mass.

19. (Amended) A liquid crystal composition according to claim 13, wherein

the liquid crystal composition has a dielectric anisotropy value of no more than -0.2.

20. (Amended) A liquid crystal display element according to claim 1, wherein the liquid crystal display element has an active matrix drive system.

21. (Amended) A liquid crystal display element according to claim 1, wherein the liquid crystal display element has a liquid crystal alignment regulated by the alignment control layer to be vertical to a surface of the substrate .

Brief Statement under Article 19

In original claim 14, a compound represented by general formula (2)

$$R^3-B^1-Y^1-(B^2-Y^2)_p-R^4 \qquad (2)$$

is described.

On the other hand, Document 1 (JP2002-69449A), Document 2 (JP2001-40355A), and Document 3 (JP2002-532613A), which were cited in the International Search Report, disclose compounds similar to the compound represented by general forumla (2).

Accordingly, original claim 14 is canceled by amendment under PCT Article 19(1). In accordance with this amendment, claim 15 is amended to newly define the compound represented by general formula (2), and claim 16 is amended to depend on claim 1. Moreover, original claims 11 and 12 are canceled. In accordance with this amendment, claims 13 and 18 are amended to newly define the numbers of claims on which claims 13 and 18 are dependent.

Moreover, claims 2, 4 to 10, and 15 to 21 are amended to change their expression so as to clearly indicate the classification of the invention described in each of the claims. Note that the amendment for changing the expression should not be interpreted to alter the content of the invention per se. Period.